

IN THE CLAIMS

Claim 1. (Currently Amended) A network-element router, comprising:

a first processor supporting a first processing environment;

an intelligent interface between the first processing environment and a management device external to the router network-element, said intelligent interface comprising a second processor supporting a second processing environment independent of the first processing environment, the second processor being able to boot independent of a boot process of the first processing environment, an internal interface enabling the first processing environment to be accessed from the second processing environment, and an external interface connected to the second processing environment to enable the second processing environment to be accessed from the management device external to the router network-element.

Claim 2. (Currently Amended) The router network-element of claim 1, further comprising a plurality of physical interfaces for receiving data from the network and assembling packets of data, at least one network processor for processing the packets of data, a switch fabric for switching the packets of data between physical interfaces, so that the router may receive data from the network, assemble the data into packets, process the packets, switch the packets, and then output at least some of the packets of data back onto the network wherein the intelligent interface further comprises a memory.

Claim 3. (Currently Amended) The router network-element of claim 1, wherein the first processing environment comprises a first kernel, and wherein the second processing environment comprises a second kernel.

Claim 4. (Currently Amended) The router network-element of claim 1, wherein the second processor further comprises control logic enabling a new software image to be loaded onto the intelligent interface, said new software image to be used by the second processing environment to configure the first processing environment.

Claim 5. (Currently Amended) The router network-element of claim 4, wherein the intelligent interface comprises a memory, and wherein the new software image is stored in said memory.

Claim 6. (Currently Amended) The router network element of claim 1, wherein the second processor comprises control logic enabling information related to an operational condition of the first processor to be collected over the internal interface and transmitted over the external interface.

Claim 7. (Currently Amended) The router network element of claim 6, wherein the operational condition comprises at least one of Management Information Base values, logging information, and operational parameters.

Claim 8. (Currently Amended) The router network element of claim 6, wherein the second processor comprises control logic configured to enable diagnostic checks to be run on the first processing environment.

Claim 9. (Currently Amended) The router network element of claim 6, wherein the second processor comprises control logic enabling modifications to be made to the first processing environment over the internal interface.

Claim 10. (Currently Amended) The router network element of claim 1, wherein the external interface operates utilizing at least one of the Universal Serial Bus (USB) standards.

Claim 11. (Currently Amended) An intelligent management interface for a router network element, the router network element including at least one router network element processor controlling operation of the router network element in normal operation, the router further including physical interfaces and a switch fabric to receive data from the network, switch the data between the physical interfaces, and output the data back onto the network, the intelligent management interface comprising:

at least one intelligent management interface processor supporting an independent operating environment for the intelligent management interface which is separate from the operating environment supported by the at least one router network element processor and which is able to boot separate from a boot process of the at least one router network element processor

of the network element, the independent operating environment enabling the intelligent management interface to be active during the boot process of the at least one router network element processor of the network element; and

intelligence enabling the intelligent management interface to take actions on the router network element to control the boot process of the at least one router network element processor.

Claim 12. (Currently Amended) The intelligent management interface of claim 11, wherein the intelligence performs diagnostic checks on the router network element.

Claim 13. (Currently Amended) The intelligent management interface of claim 11, wherein the intelligence uploads files to the router network element.

Claim 14. (Currently Amended) The intelligent management interface of claim 11, wherein the intelligence causes a new software image to be stored on the intelligent management interface, and causes the router network element to be restarted from the new software image.

Claim 15. (Currently Amended) The intelligent management interface of claim 11, wherein the intelligence controls the router network element before, during, and after a router network element boot process.

Claim 16. (Currently Amended) The intelligent management interface of claim 11, wherein the intelligence causes at least one of files and Management Information Base (MIB) information to be transmitted from the intelligent management interface to enable a network manager to manage the router network element during at least one of a router network element boot process and in a router network element run-time environment.

Claim 17. (Previously Presented) The intelligent management interface of claim 11, wherein the intelligence implements a Universal Serial Bus (USB) stack to enable the intelligent management interface to communicate over an exterior interface utilizing at least one of the USB standards.

Claim 18. (Currently Amended) A method of managing a switch network element, comprising:

accessing a USB port on a switch network element; and
transferring management information over the USB port.

Claim 19. (Currently Amended) The method of claim 18, wherein the management information comprises a software image to be loaded onto the switch network element.

Claim 20. (Currently Amended) The method of claim 18, wherein the management information comprises Management Information Base (MIB) values indicative of at least one of performance by the switch network element and the state of operation of the switch network element.

Claim 21. (Currently Amended) The intelligent management interface of claim 14, wherein the new software image is downloaded from a centralized location accessible to multiple routers network elements, and wherein the new software image upgrades a previous software image with new software containing new features.

Claim 22. (Currently Amended) The intelligent management interface of claim 14, wherein the new software image is downloaded from a centralized location accessible to multiple routers network elements, and wherein the new software image upgrades a previous software image with a corrected version of the existing software.